

- e. **Earthquake Problem:** Earthquakes happen when rock plates slide past each other. The stress between plates that builds up over a number of years is relieved by the quake in a few seconds. Then the stress starts building up again. Sketch a reasonable graph showing stress as a function of time.



In 1989, a magnitude 7.1 earthquake struck Northern California, destroying houses in San Francisco's Marina district.

- R2. For parts a–e, name the kind of function for each equation given.

- $f(x) = 3x + 7$
 - $f(x) = x^3 + 7x^2 - 12x + 5$
 - $f(x) = 1.3^x$
 - $f(x) = x^{1.3}$
 - $f(x) = \frac{x - 5}{x^2 - 2x + 3}$
- f. Name a pair of real-world variables that could be related by the function in part a.
- g. If the domain of the function in part a is $2 \leq x \leq 10$, what is the range?
- h. In a flu epidemic, the number of people currently infected depends on time. Sketch a reasonable graph of the number of people infected as a function of time. What kind of function has a graph that most closely resembles the one you drew?
- i. For Figures 1-8b through 1-8d, what kind of function has the graph shown?

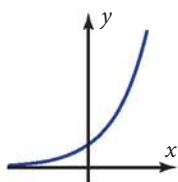


Figure 1-8b

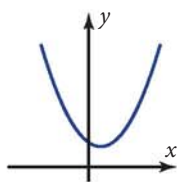


Figure 1-8c

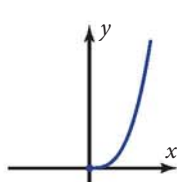


Figure 1-8d

- j. Explain how you know that the relation graphed in Figure 1-8e is a function but the relation graphed in Figure 1-8f is not a function.

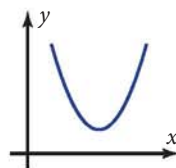


Figure 1-8e

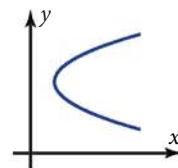


Figure 1-8f

- R3. a. For functions f and g in Figure 1-8g, identify how the pre-image function f (dashed) was transformed to get the image function g (solid). Write an equation for $g(x)$ in terms of x given that the equation of f is

$$f(x) = \sqrt{4 - x^2}$$

Confirm the result by plotting the image and the pre-image on the same screen on your grapher.

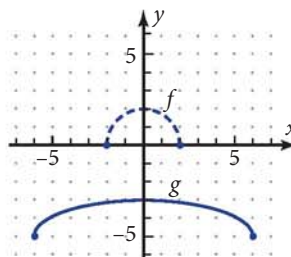


Figure 1-8g

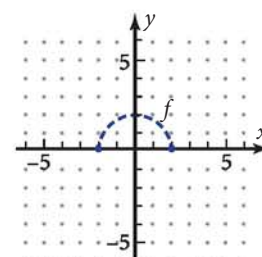


Figure 1-8h

- If $g(x) = 3f(x - 4)$, explain how function f was transformed to get function g . Using the pre-image in Figure 1-8h, sketch the graph of g on a copy of this figure.
- R4. **Height and Weight Problem:** For parts a–e, the weight of a growing child depends on his or her height, and the height depends on age. Assume that the child is 20 in. when born and grows 3 in. per year.
- Write an equation for $h(t)$ (in inches) as a function of t (in years).
 - Assume that the weight function W is given by the power function $W(h(t)) = 0.004h(t)^{2.5}$. Find $h(5)$, and use the result to calculate the predicted weight of the child at age 5.
 - Plot the graph of $y = W(h(t))$. Sketch the result.